Name:

at1117paper: Complete the Square (v329)

Example

A square's edge length is x feet. A rectangle has a height of x feet and a width of 44 feet. Their combined area, found by adding the square's area and the rectangle's area, is 960 square feet. What is the value of x?

Example's Solution

$$x^2 + 44x = 960$$

To complete the square, add $\left(\frac{44}{2}\right)^2 = 484$ to both sides.

$$x^2 + 44x + 484 = 1444$$

Recognize the left side is now a perfect-square trinomial. Factor the left side.

$$(x + 22)^2 = 1444$$

Undo the squaring.

$$x + 22 = \pm\sqrt{1444}$$

$$x + 22 = \pm 38$$

Subtract 22 from both sides.

$$x = -22 \pm 38$$

In this geometric example, we are only concerned about the positive solution. So,

$$x = 16$$

Question 1

A square's edge length is x feet. A rectangle has a height of x feet and a width of 52 feet. The total area, of the square and rectangle, is 1925 square feet. What is the value of x?

Question 2

A square's edge length is x feet. A rectangle has a height of x feet and a width of 60 feet. The total area, of the square and rectangle, is 2125 square feet. What is the value of x?

Question 3

A square's edge length is x feet. A rectangle has a height of x feet and a width of 38 feet. The total area, of the square and rectangle, is 728 square feet. What is the value of x?